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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,470	01/31/2006	Fumihiro Yaguchi	00380487PUS1	3906

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EXAMINER	
STIMPERT, PHILIP EARL	

ART UNIT	PAPER NUMBER
3746	

NOTIFICATION DATE	DELIVERY MODE
06/01/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/566,470	YAGUCHI, FUMIHIRO	
	Examiner	Art Unit	
	Philip Stimpert	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. (4,965,864) in view of Wright (US 4,864,849), Ohki et al. (US 5,302,872), and Welterlin (US 4,578,606).

3. Regarding claim 1, Roth et al. teach an electromagnetic pump (generally shown in Fig.1) comprising a cylinder (3), a moving member (5) being movably accommodated in the cylinder (3), the moving member having a permanent magnet (col. 3, ln. 36-37), electromagnetic coils (1) fitted around the cylinder (3), the electromagnetic coils (1) reciprocally moving the moving member (1) in the axial direction when electricity is supplied to the coils (1, see col. 3, ln. 36-40), and pump chambers formed in the cylinder (3, to the left and right of the piston 5, delimited by valve heads 8) for sending a fluid. Roth et al. also teach control circuitry (12), and that the control circuitry may include piston position sensors (col. 3, ln. 52). Roth et al. do not teach any particular type of piston position sensor, that their electromagnetic coils are air-core coils, nor an magnetic circuit constituted by the yokes.

Ohki et al. teach the use of air-core coils in a linear motor. Ohki et al. also indicate that air-core coils and ferromagnetic core coils are generally interchangeable

(col. 3, ln. 14-17) and are useful in producing linear motion. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use air-core coils as taught by Ohki et al. as the electromagnetic drive coils of Roth et al., in order to produce linear motion of the piston of Roth et al.

Wright teaches a viscometer, which measures viscosity of a fluid by detecting the position of a bob. In particular, Wright teaches that a circuit may be attached to the electromagnetic driving coils of the bob, so as to "detect bob position by monitoring the mutual inductance between drive coils whose mutual inductance is affected by the position of the bob, which contains ferromagnetic material," (col. 2, ln. 50-53). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an air core coil in the pump of Roth et al. as the position sensors desired by Roth et al., in the manner taught by Wright. Further, it would be obvious to provide the air core detecting coil close to and between two drive coils, as this would be an analogous position to that taught by Wright.

Welterlin teaches an electric motor and tachogenerator assembly. In particular, Welterlin teaches a speed detecting coil (38) which is emplaced between two yokes (34, 36) in its own magnetic circuit (col 6, ln. 12-15) as part of the tachogenerator assembly (col. 4, ln. 35-59). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide upper and lower yokes as taught by Welterlin to the detecting coil of Wright in the system of Roth et al., in order to form a magnetic circuit to enhance the position detecting functionality of the coil. Thus provided, the upper and lower yokes of Welterlin would constitute yokes provided to the axial end

faces of the detecting coil, while the outer peripheral portion of the outermost yoke would constitute an outer yoke. As taught by Welterlin (col. 4, ln. 60), changes in the magnetic flux in the circuit are used in the detection process.

4. Regarding claim 3, Roth et al. teach that the medium into which the electromagnetic driving coils (and detecting coils, in the combination) are set may be provided with iron filings (cols. 3-4, ln. 60-2), thus forming a yoke made of magnetic materials provided to the axial end faces and outer circumferential faces of the coils.

5. Regarding claim 4, the induced voltage in each detecting coil would inherently be twice as high as the frequency of the reciprocation of the moving member (5) of Roth et al., since the voltage is induced by motion of the moving member (5) relative to the coils (1), which motion will take place twice per reciprocation cycle.

6. Regarding claim 5, none of the presently combined references explicitly teach the detection of flow volume. However, Roth et al. teach that stroke length may be determined based on the input from the sensors of the pump (cols. 3-4, ln. 64-8). In a cylinder of fixed diameter (as taught by Roth et al.), stroke length is directly proportional to flow volume, thus Roth et al. effectively teach that flow volume of their pump is detected on the basis of their sensors, which as taught by Wright detect induced voltage in the detecting coils (1).

7. Regarding claim 6, in the pump of Roth et al. as modified in particular by Wright, any nonzero flow (i.e. greater than a prescribed value of zero) volume of the pump is detected on the basis of a threshold value (i.e. greater than zero) of the induced voltage in the detecting coil (1).

8. Regarding claim 7, in the pump of Roth et al. as modified in particular by Wright, any reciprocation of the moving member (5), normal or abnormal, is detected based on induced voltage in the detecting coil (1), i.e. induced voltage greater than a threshold of zero.

9. Regarding claim 8, Roth et al. teach that the motion of the moving member (5), in particular the stroke length (cols. 3-4, ln. 64-8) is controlled on the basis of the input from the position sensor, which detects induced voltage, in particular over a zero threshold.

10. Regarding claim 9, the induced voltage detected by the coils (1) of Roth et al. as modified by Wright, must inherently fall within a detection range, else it would not have been detected. Further, since the detecting coil as taught by Wright is presumed to be functional, any variation in the induced voltage caused by magnetization of the coil would be presumed to be small enough as to allow operation of the detecting coil.

Response to Arguments

11. Applicant's arguments, see page 5, filed 14 January 2009, with respect to the rejection(s) of claim(s) 1 and 4-9 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the previously applied references and Welterlin, as detailed above.

12. Applicant's arguments with respect to claims 1 and 4-9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art Unit 3746

/P. S./
Examiner, Art Unit 3746
22 May 2009